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Pricing deviation, misvaluation comovement, and macroeconomic conditions

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ABSTRACT

We measure an individual stock's misvaluation based on the deviation of its price from predicted intrinsic value. Both under- and overvalued stocks identified by this misvaluation measure exhibit greater valuation uncertainty and arbitrage difficulty, and the misvaluation measure strongly predicts stock returns incremental to size, book-to-market ratio, past returns, and various return anomalies. Based on the misvaluation measure, we form a misvaluation factor and find that stock return covariances with this factor possess significant and robust return predictive power. We further show that the misvaluation factor predicts future economic conditions, providing additional insight into the real effect of systematic misvaluation in the stock market.

1. Introduction

The existence of investors' cognitive biases and arbitrage limits suggests that stock misvaluation cannot be fully eliminated by rational investors in the market, but rather is only corrected over time. Behavioral finance studies further predict that misvaluation comoves in the stock market. Such comovement could arise from fluctuations in market-wide sentiment, the common movements of noise traders, investors' "style investment", or retail investors' common misperceptions of firms' prospects and correlated trading (De Long et al., 1990; Barberis and Shleifer, 2003; Kumar and Lee, 2006). These studies reveal that systematic retail sentiment or trading has incremental explanatory power for return comovement beyond the usual risk factors, which may result from the fact that retail investors move the market and contribute to the commonality in stock misvaluation.

Motivated by the aforementioned studies, in this study, we examine misvaluation comovement and stocks' systematic misvaluation in the market. We measure individual stocks' misvaluation directly based on their pricing deviations from industry norms. Using the pricing deviation-based misvaluation measure, we form a misvaluation factor and examine whether loadings on this factor predict future stock returns. Furthermore, we explore the relation between the misvaluation factor and future states of the economy, which provides additional insight into the real effect of systematic misvaluation in the stock market.

Our study is related to Hirshleifer and Jiang (2010). They identify common misvaluation across stocks based on firms' debt and equity financing, and builds a financing-based misvaluation factor (*UMO*) from repurchase and new issue firms.[3] In contrast to their study, we measure misvaluation according to the difference between the observed market prices and predicted intrinsic values of individual stocks. We follow Rhodes-Kropf et al. (2005) in estimating a firm's intrinsic value based on its book value, net income, and leverage, along with the pricing for each of these three components within the firm's industry. Rhodes-Kropf et al. (2005) find that the three accounting variables explain around 80–94% of the within-industry variation in firm values, and define firm misvaluation as the deviation of the market price from the intrinsic value implied by the

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[3] Their underlying assumption is that firms' financing activities reflect managers' responses to equity misvaluation. Firms tend to issue equity or debt when they are overvalued and buy back equity or retire debt when undervalued.

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financial variables and contemporaneous industry pricing.[4] Many other studies also use this method to identify misvaluation in different contexts (e.g., Hertzel and Li, 2010; Hoberg and Phillips, 2010), and we denote firm misvaluation as MSV^F in this paper.

The pricing deviation-based approach has several advantages over the financing-based approach of Hirshleifer and Jiang (2010) in the investigation of the relation between stock misvaluation and the cross section of expected stock returns. As it is not conditional on management's behavior, it is not subject to the concern that firms may issue or retire shares for reasons other than mispricing.[5] It measures misvaluation directly for individual stocks and thus allows us to examine the performance and characteristics of stocks with different degrees of misvaluation, which is difficult under the financing-based approach. Moreover, the pricing of *UMO* needs to be differentiated from the share issuance effect, as Pontiff and Woodgate (2008) argue that the latter drives the return predictability of firms' financing activities. Our approach does not encounter such a challenge.

Before testing the return predictability of MSV^F, we first examine its association with various stock characteristics. We sort stocks into deciles based on MSV^F and find that firm age, profitability, dividend-paying propensity, and asset tangibility all exhibit an inverted *U*-shaped pattern across the MSV^F deciles, whereas the standard deviation of analysts' forecasts and idiosyncratic volatility both display a *U*-shaped pattern. The evidence suggests that stocks with a higher degree of misvaluation, either under- or overvaluation, tend to be younger, less profitable, less likely to pay out dividends, and less tangible in addition to having lower greater dispersion in analysts' forecasts and higher idiosyncratic volatility. According to Baker and Wurgler (2006), such stocks have greater valuation uncertainty and arbitrage difficulty, which could add to their degrees of misvaluation.[6] The evidence lends further support to the use of MSV^F as a measure of stock misvaluation.

Based on MSV^F, we empirically test the relation between stock misvaluation and future returns. MSV^F exhibits incremental return predictive power over conventional variables including size, book-to-market ratio, return reversal, and momentum. The control of the share issuance measure of Pontiff and Woodgate (2008), which captures firms' financing activities in a broader way, has little influence on the relation between MSV^F and returns, suggesting that MSV^F captures misvaluation from a perspective that is different from that of firms' financing activities. The results are also robust to the control of idiosyncratic volatility, operating accruals, asset growth, investment-to-asset ratio, leverage, and the changes in the market value of equity over the past five years.[7]

To examine the commonality in misvaluation across stocks, we sort stocks based on MSV^F and form a misvaluation factor (MSV) by measuring the returns on a factor-mimicking portfolio that goes long on stocks in the bottom 30% MSV^F group (undervalued stocks) and short on stocks in the top 30% MSV^F group (overvalued stocks) over the period from July 1968 to December 2011. *MSV* yields an average return of 0.78% per month, which remains significantly different from zero with a magnitude of 0.50% per month after controlling for market, size, book-to-market ratio, momentum, liquidity, investment, and leverage factors, along with the *UMO* factor of Hirshleifer and Jiang (2010). The Sharpe ratio associated with *MSV* is 0.35, which is higher than that of other factors. More importantly, we find that stock return covariances with the misvaluation factor, captured by stock loadings on *MSV*, are significantly positively related to future stock returns. The results hold at both the portfolio and individual stock levels, and the control of stock loadings on other return factors, including *UMO*, has little influence on the return predictive power of stocks' sensitivities to *MSV*. In addition, we find that the return predictive powers of stock loading on the misvaluation factor and the firm misvaluation measure MSV^F are not subsumed by each other. As the loading on *MSV* captures comovement with market-wide misvaluation and the characteristic measure MSV^F captures both systematic and idiosyncratic misvaluation, the evidence is in line with the conjecture of Daniel et al. (2005) that both misvaluation components can act as return predictors.

Finally, to further our understanding of the relation between systematic misvaluation and the cross section of expected stock returns, we examine the relation between the misvaluation factor and future economic conditions. We conjecture that *MSV* contains information on market-wide misvaluation and therefore could help to predict future states of the economy. The empirical results show that *MSV* is positively related to the correction of average misvaluation across individual stocks. A high *MSV* indicates faster correction of misvaluation, which is likely to be followed by improving resource allocation efficiency in the real economy. A low *MSV*, on the contrary, suggests that misvaluation is prevailing in the stock market, which could be value-destroying through distorting the decision-making of market participants. We thus expect a higher (lower) *MSV* to be associated with a lower (higher) probability of future recession. The empirical results support our prediction. *MSV* is significantly negatively related to the likelihood of future recession, and the result is robust to the control of other conventional return factors. The evidence further implies that stocks that comove more with the undervalued stocks are better able to prosper than stocks that comove more with the overvalued stocks when good states of the economy are expected, which sheds light on the return forecasting power of individual stocks' sensitivities to the misvaluation factor.

Our findings challenge the classical view of asset pricing, and contribute to the literature by providing additional evidence of stock return comovement arising from market inefficiency.[8] This paper also supplements Hirshleifer and Jiang (2010) by providing further evidence of misvaluation comovement using a distinct approach in identifying stock misvaluation. By exploring the information content of commonality in misvaluation and examining the relation between the misvaluation factor and future states of the economy, this paper enriches our understanding of the real effect of systematic misvaluation in the stock market.

The rest of this paper is organized as follows. Section 2 describes our data and methodology, Section 3 examines the stock properties associated with the pricing deviation-based misvaluation measure, Section 4 investigates the relation between stock

[4] In addition to the firm-level misvaluation measure discussed in this study, Rhodes-Kropf et al. (2005) also propose methods for identifying misvaluation at the industry level (e.g., whether the entire industry is mispriced) based on long-run pricing multiples. The incorporation of industry-level misvaluation in measuring stock misvaluation only strengthens our results. For simplicity's sake, we consider only firm-level misvaluation in this study.

[5] In addition to mispricing, firms' financing activities can also be driven by a variety of factors such as changes in liquidity needs, growth opportunities, and dividend payments (Kim and Weisbach, 2008; Lyandres et al., 2008; Hertzel and Li, 2010). Likewise, not all firms will undertake equity issues or repurchases once misvaluation occurs given the high transaction costs and other forms of market friction.

[6] The factors that determine the direction of misvaluation (over- or undervaluation) are unclear. The results show that undervalued (overvalued) stocks tend to be small (large), have high (low) book-to-market ratio, and are more likely to be past losers (winners). It is possible that valuation uncertainty and arbitrage difficulty attract unsophisticated traders who tend to chase stocks with greater visibility and growth opportunities but ignore less visible stocks and value stocks, and tend to overreact to past return trends assuming that the trends will continue.

[7] The control of these variables is motivated by Ang et al. (2006), Sloan (1996), Cooper et al. (2008), Lyandres et al. (2008), Ferguson and Shockley (2003), and Gerakos and Linnainmaa (2012)

[8] Several studies have attempted to examine the return comovement resulting from market imperfections from different perspectives, e.g., Lee et al. (1991), Barberis et al. (2005), Baker and Wurgler (2006, 2007), Kumar and Lee (2006), Barber et al. (2009),Ho and Hung (2009), and Berger and Turtle (2011).